



# **EOSDIS**

NASA'S EARTH OBSERVING SYSTEM  
DATA AND INFORMATION SYSTEM

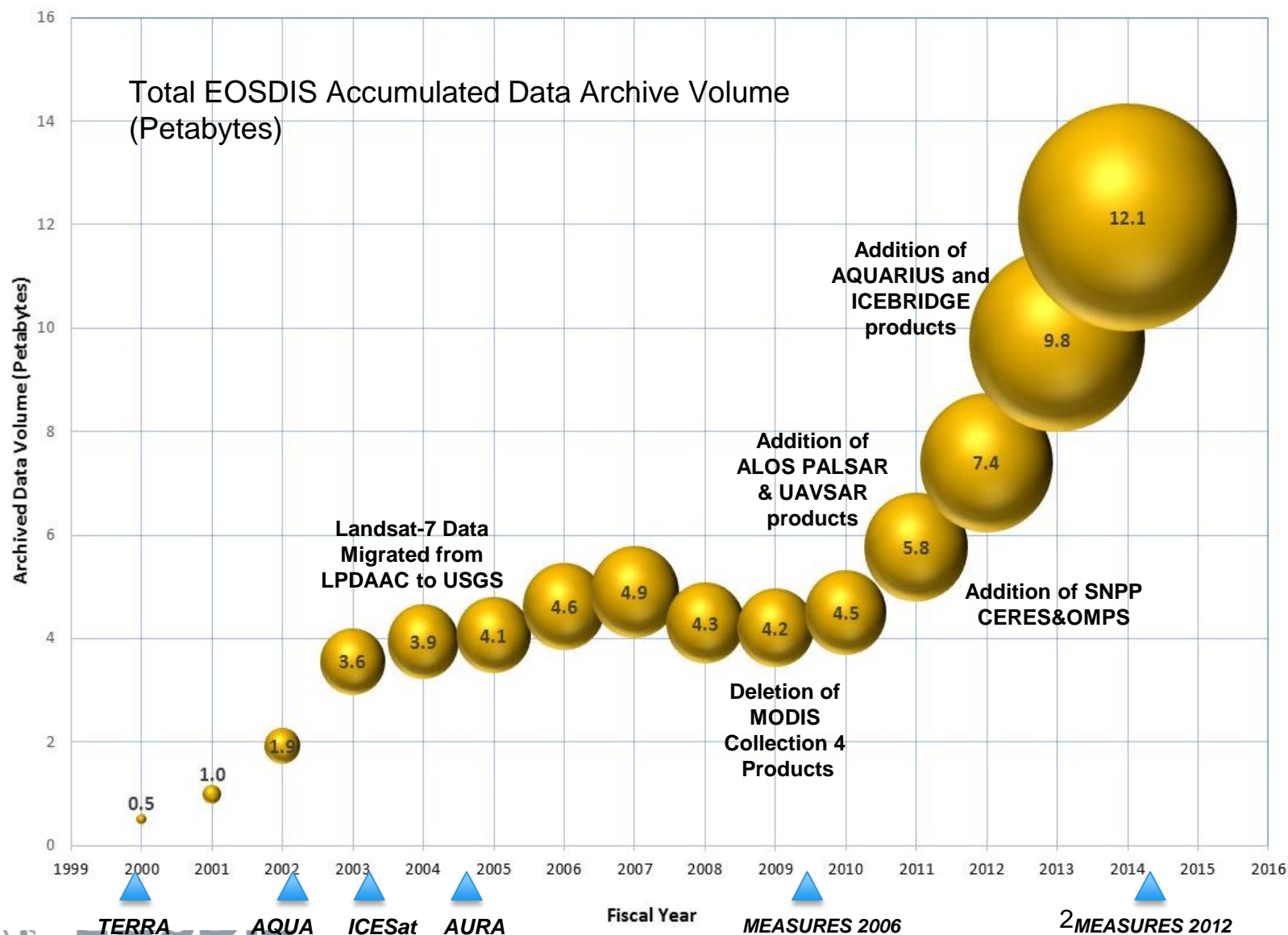
# **Big Data and Cloud Computing Expert Panel**

Assessing Cloud-Native Architectures for EOSDIS  
Applications

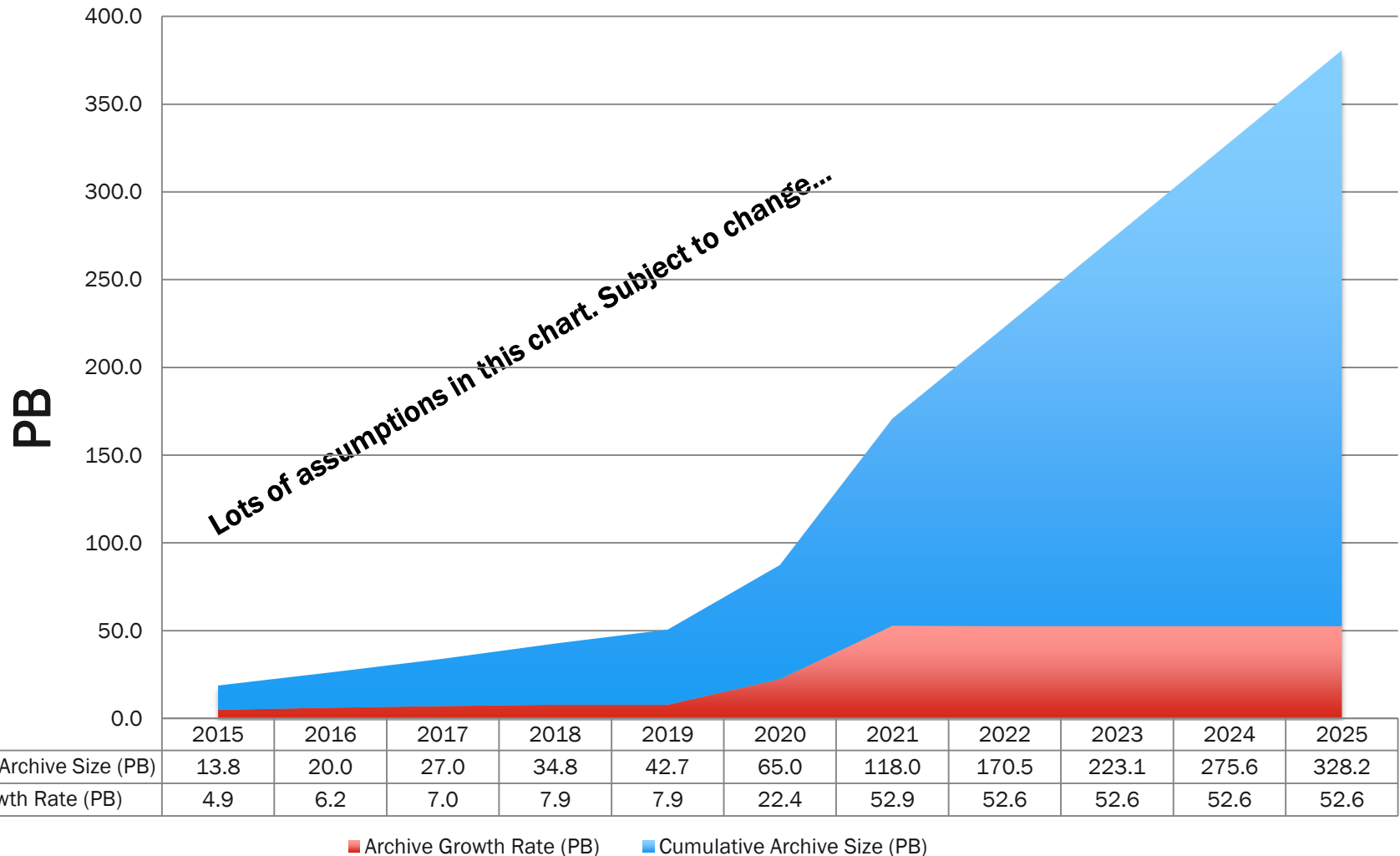
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The material is based upon work supported by the National Aeronautics and Space  
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# 15+ years of Earth Science Data



# EOSDIS Archive Growth Estimate (Prime + Extended)



# EOSDIS Vision 2020 (cloud relevant)

- Data Analysis at Scale
  - Users are able to analyze the entire data record for any data variable over any arbitrarily defined area.
- Data and Processing Mobility
  - Data and processing move transparently as necessary to achieve optimal performance.
- Dataset Upgrading
  - High-value datasets are upgraded as necessary to fully support in the rich capabilities available in the data systems.
- Virtual Collections...
  - ...can be organized/oriented around a science problem.
- Combining Data, Combining Tools
  - NASA data can be combined\* with data from other agencies, nations and other entities
  - Tools and services within the community are easy to combine.

\*combined = compared / merged / fused / assimilated

# So what does this impact?

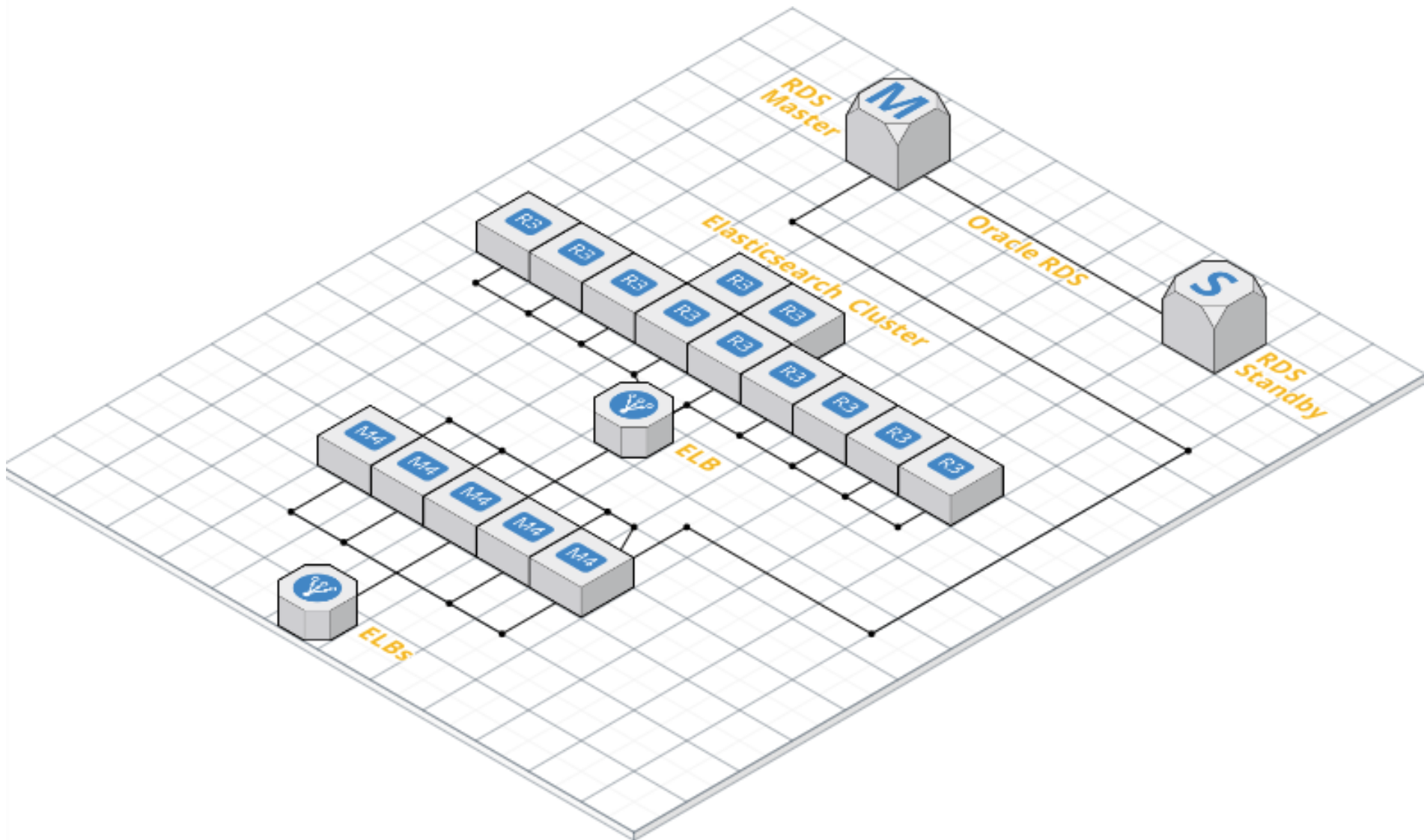
# Infrastructure, Scaling, Monitoring, Security, ...

# Development model, Compliant Deployment, Operations, ...

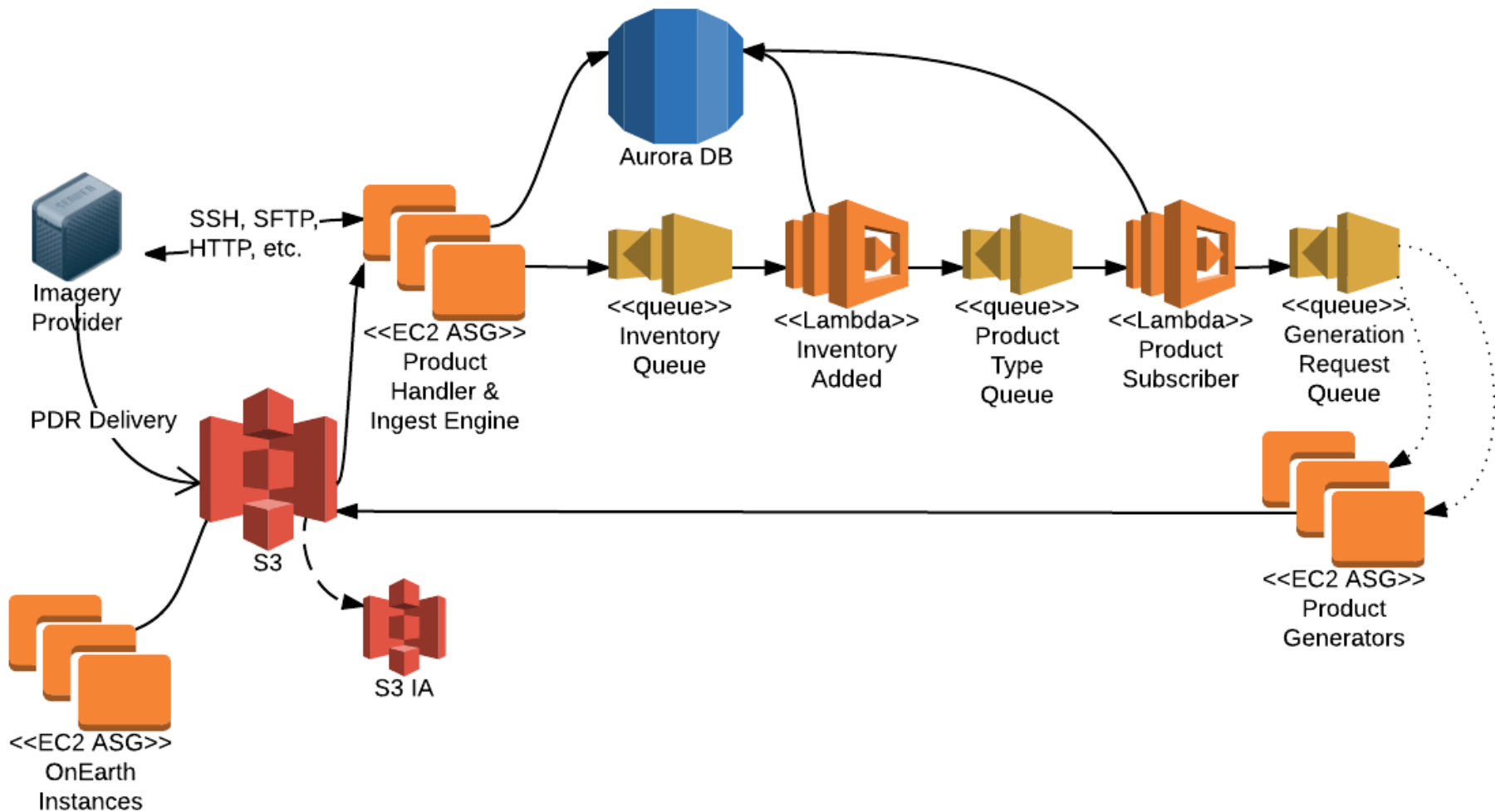
# Application Architecture



# CMR in the Cloud

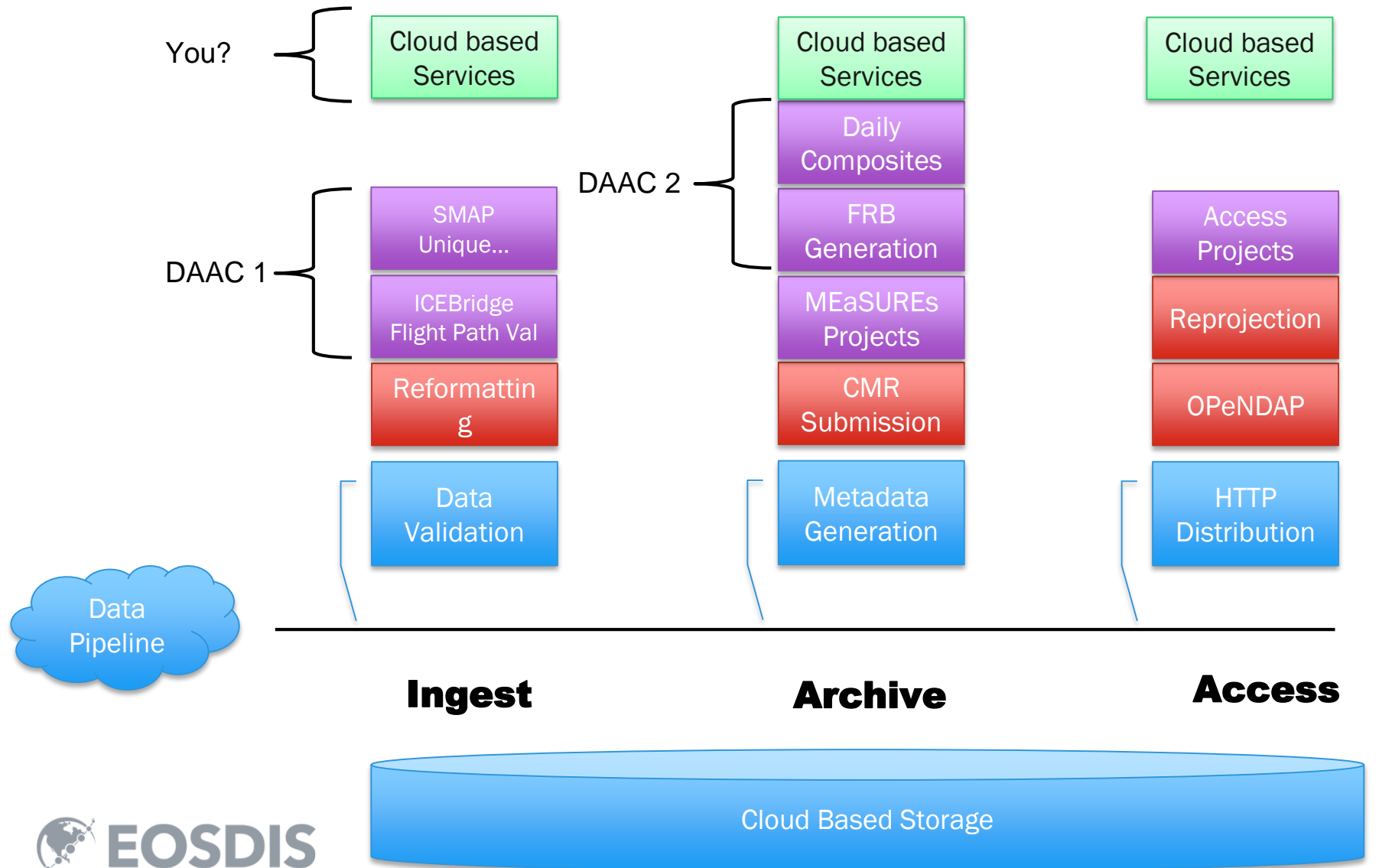


# GIBS in the Cloud?



# Systems Architecture

# Cumulus I&A Prototype



Exploiting cloud computing sets the stage for EOSDIS as a platform, enabling an AppStore model for services and micro-services meeting end-user needs.

# What does this mean?

- Need widespread knowledge of cloud architectures and patterns (inc. NGAP, serverless, 12 factor applications)
- Rapid pace of change
- Potentially dramatic change in data usage patterns
- Need for Cloud Native data formats
- Need for Cloud Native services

# Outstanding Questions...

- Existing prototyping efforts have been restructured to **systematically** and **realistically** investigate and test commercial cloud environments for essential EOSDIS and DAAC operations.
  - Isolated prototypes have demonstrated unrestricted cloud environments offer performance and cost benefits under specific situations, but **can operational NASA science data systems** function effectively in a commercial cloud environment?
  - Do commercial clouds offer increased efficiency within a NASA environment and/or provide additional functionality? How do costs compare to opportunities and risks?
  - How can NASA efficiently partner with commercial cloud providers to improve services and usage of data and services?

# Thank you!

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